Physical Chemistry Chemical Physics 2016 vol.18 N16, pages 10992-10999

# The role of the confined water in the dynamic crossover of hydrated lysozyme powders

Kurzweil-Segev Y., Greenbaum A., Popov I., Golodnitsky D., Feldman Y.
*Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia*

## Abstract

© the Owner Societies 2016.Water is of fundamental importance for life since it plays a critical role in biological systems. An organism can only function if its macromolecules and other bioactive molecules are hydrated. However, currently there is a gap in the understanding of how protein interfaces affect water's structure and properties. This work presents combined dielectric and calorimetric measurements of hydrated lysozyme powders with different levels of hydration in a broad temperature interval. We chose lysozyme as a test sample since this globular protein has a well-defined pore with an active hydrophilic center inside. Based on the dielectric and calorimetric tests it was shown that a water quasi-solution, which contains the protein residues, has a glass transition temperature at around 155 ± 3 K. The water confined in the pore of the active center of the lysozyme has its melting temperature at around 186 ± 3 K. Melting of confined water is believed to liberate the internal motions of protein macromolecules.

http://dx.doi.org/10.1039/c6cp01084a